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Medical Student Involvement in Research in the Pre-clinical Years

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Medical student participation in research activities is encouraged during the pre-clinical years at the John A Burns School of Medicine (JABSOM). Studies have shown that participation in research activities early in their careers are more likely to become physician-scientists.[1-2] JABSOM has experienced a dramatic increase in research grants and contracts awarded to the school since Dr. Edwin Cadman's appointment as Dean in 1999. As a result, students have been provided opportunities to learn actively about and to pursue research activities with local researchers.

Among the first year medical students in the Class of 2008, only 6 students hold advanced degrees (5 Masters' level and 1 PharmD). Thus many students have not participated in active research before entering medical school. A course entitled "Student Research Project" (BIOM 594) was developed to address this need.

The goal of the Student Research Project is to expose MD students to research experiences appropriate to their future roles and career paths as clinicians, physician-scientists, and educators. The development of research skills of a practical and general nature are the objectives of this program rather than research specialization required of those who pursue a biomedical PhD degree. Nine weeks between Units 3 and 4 (the second year) are reserved for research activities. Many students, on their initiative, choose to begin their research during their first year of medical school.

After the implementation of PBL (Problem Based Learning) in 1989, student involvement in research took two forms. First, medical students interested in research could sign up for a one-credit research elective and work under a research mentor. Thus a student could learn in depth about research from a faculty member. The student would be exposed to research concepts as well as the laboratory. An elective handbook provided a list of JABSOM faculty members and their areas of interest and expertise. Second, during their preceptorship, students complete a community project in conjunction with a primary care preceptor. Together, the student and preceptor worked to develop a project of value to either the preceptor's practice or community. Examples of projects from the Class of 2003 included, Heath Chung and Stanley Tseng, MD studying *"The Role of Board Certification in a Patient's Selection of a Physician"* and Glenn Garo with Kamal Masaki, MD and David Johnson, PhD on *"The Health Status of Filipinos in Honolulu Today"*.

In 1999, headed by Bill Johnson, a group of proactive first year medical students proposed a change in JABSOM's research requirement. These students felt that every medical student should be aware of the role of research in medicine and have an opportunity to participate in a structured research program. Their proposal included 1) a Student Research website that lists current research opportunities available to students. Faculty and community researchers submitted electronically a general description of their research for students to review. Students interested in organizing an elective or arranging a summer research project could browse this website. The website was initially developed by Dr. Steven Seifried and supported by a NIH/NCRR grant. The website is still active and can be found at http://brin.hawaii.edu/researchopps/, 2) a ten-hour "Research Exposure Short-Course". This short-course was a series of talks interspersed throughout Units 1 through 5 and introduced students to basic research concepts and 3) students wishing to pursue an in-depth research experience could enroll in a Research Mentor Elective. The MD Program Committee adopted this proposal in 1999.

This concept has been modified throughout the succeeding years. The current format of the Student Research Project is for each student to identify an active researcher to supervise their work, develop a research plan, and participate in a project in clinical medicine, basic sciences, or community medicine. The learning objectives are: 1) to develop a basic understanding of research by working with a research faculty member, 2) to develop an understanding of ethics in research, including the role of the Institutional Review Board (IRB) and 3) to develop a general understanding of research design and data analysis. Table 1 lists suggested topics for the student to discuss with their research mentor. Students at the completion of a project are encouraged to present their finding at local and national

Table 1.— Suggested Topics For Students To Discuss With Their Research Mentor
Choosing a meaningful and feasible research question
Quantitative versus qualitative research (e.g. deductive v. inductive reasoning)
Theory-driven hypothesis formation and the role of the literature review
Research ethics, IRB procedures and oversight
Research design and logic (e.g. hypothesis generation and testing; experimental v. quasi-experimental designs; concepts of significance, correlation, and causality, etc)
Research design issues (e.g. reliability, validity, error and bias)
Research instruments and statistics
Data collection
Understanding basic statistics
Data interpretation and reporting
Presentation of findings (e.g., papers, presentations and posters)

meetings. Funds to defray the cost of travel are available from the Dean's Office for those who have their papers accepted for presentation at local or national meetings.

Research highlights from the Class of 2007 are:

Jonathan Reitzenstein—mentors, Amy Brown, PhD and Martin Janus, PhD (Department of Human Nutrition, Food and Animal Sciences, University of Hawaii), The Antiproliferative Effect of Poi (Colocasia esulenta) on Colonic Adenocarcinoma Cells in Vitro;

Marci Peralto—mentor, Jennifer Ko, MD (Lawndale Christian Health Center, Chicago), Blood Lead Screening and Childhood Immunization in North Lawndale;

Joey Kahatsu—mentor, faculty of the Department of Geriatric Medicine (John A Burns School of Medicine), T-Axis Deviation Predicts 8-Year Incidence Coronary Heart Disease in Elderly Japanese American Men: The Honolulu Heart Program;

Adam Bracha—mentor, Hyo-Chun Yoon, MD (Kaiser Moanalua Medical Center and JABSOM), Coronary Calcium Scoring with Electron Beam and Multidetector CT: Interscan CT: Comparing Interscan Variation Using Two Scoring Algorithms;

Leah Nakamura—mentor, faculty of the Department of Geriatric Medicine (John A Burns School of Medicine), Caregivers for Demented Patients: Do They Have a Higher Risk for Mortality and Depression?

Victor Wong—mentor, faculty of the School Health Education Program (SHEP), Medical Students' Dual Roles as Both Classmates and Teachers to High School Students in Medical Education.

From the SHEP program and the Class of 2008, headed by Dr. Gwen Naguwa:

Misha Kassel and Cassie Lee: Effect of Small Groups on Learning and Application to Health Decision Making,

Cindy Ta and Marc Kaneshiro, Community Health Program: Influencing First Year Medical Student Future Career Decisions,

Kyle Chun, Assessing the Correlation Between Standardized Testing Scores and Performance on Lesson-Based Evaluations in Hawaii High School Students,

Gina Fujikami and Lauren Okamoto, The School Health Education Program: Assessing Adaptive Communication Strategies in the Classroom as a Model for Developing Effective Doctor-Patient Communications.

The following students also presented their research at the JABSOM Biomedical Sciences Symposium held on April 28, 2005: Kyle Chun, Gina Fujikami and Lauren Okamoto, Misha Kassel and Cassie Lee, Joey Kohatsu, Leah Nakamura, Cindy Ta and Marc Kaneshiro, and Victoria Wong. Kyle Chun was awarded a prize for the best presentation by a medical student.

The Student Research Project also offers opportunities for faculty members interested in promoting student research. For example, The Native Hawaiian Center of Excellence has developed a program to train and retain medical students interested in research on Native Hawaiian health issues.[3] SHEP gives students the opportunity for community service while providing a structured research program.[4] The Geriatric Department at JABSOM provides opportunities for students to shadow a geriatrician as well as explore research interests in geriatrics.

Since Dean Cadman's arrival in 1996, there has been a dramatic increase in the research grants and contacts awarded to the School. In turn there has been an emphasis on encouraging medical students to participate actively in research activities. Research by students in the preclinical years at JABSOM is student-centered and depends on the initiative and creativeness of the students to seek out research opportunities. The success of the Student Research Project, however, is related directly to the many individuals who unselfishly open their laboratories to students. Their continued support is essential to developing the future physician-scientists for the State.

References

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4. Naguwa, G, Kramer, K, Fukuda, M and Kasuya, R 2004. Students Teaching Students: Community Health's School Health Education Program (SHEP). Hawaii Med J 63(3):89-90.